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JP 2001-291760

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CLAIMS

[Claim(s)]

[Claim 1] The exfoliation approach characterized by facing the article processed from the tape for immobilization at the time of processing exfoliating, and making a work article adhere to the tape for exfoliation.

[Claim 2] The exfoliation approach according to claim 1 which the tape for exfoliation is porosity material, faces making a work article adhere, and attracts from other fields of the tape for exfoliation (reduced pressure).

[Claim 3] The exfoliation approach according to claim 2 characterized by porosity material consisting of a porous poly membrane.

[Claim 4] The exfoliation approach according to claim 2 or 3 characterized by making a porous base material intervene between the equipment for drawing in (reduced pressure) or a fixture, and porosity material.

[Claim 5] The exfoliation approach according to claim 2 to 4 which is what has adhesiveness in extent which can prevent omission and a gap of the processing product which adhered when the front face of porosity material returned to ordinary pressure.

[Claim 6] An exfoliation tape and the exfoliation approach given in five from claim 1 whose content of processing is back grinding or the dicing process of a semi-conductor wafer.

[Claim 7] The tape for exfoliation which consists of porosity material of permeability.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] From the tape for immobilization for fixing the article which should be processed at the time of processing, especially, this invention relates to the approach of exfoliating the article after processing which demonstrates effectiveness, when work articles are the approach of exfoliating the article after processing, and the thing which is easy to damage thinly.

[0002]

[Description of the Prior Art] Since it is equivalent to the thin product in an IC card etc. or it multilayers and carries out densification of the semiconductor device by making it thin, while the semi-conductor wafer has diameter[of macrostomia]-ized the wafer itself with enlargement of a component, the application which makes thickness of a wafer thin is increasing in recent years. The reinforcement of the wafer in which the semiconductor device was formed is reduced, in the production process, it is easy to generate troubles, such as a crack and a chip, they have become, and this cure is important for this diameter[of macrostomia]-izing and thinning.

[0003] Back grinding and a dicing process are mentioned as a process which such a trouble tends to generate.

[0004] At a back grinding process, a back-grinding tape is stuck for the purpose of contamination, breakage prevention, etc. of a field in which the semiconductor device was formed, at the process which grinds the semi-conductor wafer in which the semiconductor device was formed, to predetermined thickness. However, in case it exfoliates from the back-grinding tape which has high adhesion after processing termination, a big distortion occurs to a wafer and it is easy to generate a crack and a chip.

[0005] On the other hand, a dicing process is a process cut and divided from a semi-conductor wafer after a back grinding process at each semiconductor device. At this process, a semi-conductor wafer is fixed on the dicing tape on which the binder was applied to base tapes, such as a vinyl chloride and polyester, it is taken up by the attraction fixture called a collet and each component after cutting is conveyed to degree process. While sufficient adhesion in which each component does not disperse is required for this dicing tape at the revolution by the dicing saw at the time of cutting, it needs to be satisfied with each component of the conflicting requirement that it is adhesion with low extent which does not require a load, at the time of pickup.

[0006] Therefore, although the dicing tape which is called UV type recently, irradiates ultraviolet rays (UV) before being high adhesion and taking up at the time of cutting, and responds adhesion to several [1/] to 1/10 or less at a lowering conflicting requirement is adopted widely Even if it fell, in order that variation was in the adhesion lowering by UV irradiation, or several g adhesion might remain, at the time of pickup, it needed to thrust up by the pin from the bottom, therefore also conventionally thrust up, and there was not no damage of the component by the pin. Furthermore enlargement of a component and thin shape-ization progress, the damage by the pressure-from-below pin becomes remarkable, and the cure is becoming important.

[0007]

[Problem(s) to be Solved by the Invention] This invention was made in view of the above-mentioned problem, and the object is in offering the exfoliation approach which can prevent breakage of the article generated in case the article is exfoliated from the fixed tape for fixing an article at the time of processing like the back grinding process of a semi-conductor wafer, or a dicing process.

[0008]

[Means for Solving the Problem] This invention relates to the following.

1. Exfoliation approach characterized by facing article processed from tape for immobilization at time of processing exfoliating, and making work article adhere to tape for exfoliation.
2. Exfoliation approach of term 1 publication which tape for exfoliation is porosity material, faces making work article adhere, and attracts from other fields of tape for exfoliation (reduced pressure).
3. Exfoliation approach of term 2 publication characterized by porosity material consisting of porous poly membrane.
4. Term 2 characterized by making porous base material intervene between equipment for drawing in (reduced pressure) or fixture, and porosity material, or exfoliation approach given in three.
5. Exfoliation approach given in either of terms 2-4 which are what has adhesiveness in extent which can prevent omission and gap of processing product which adhered when front face of porosity material returned to ordinary pressure.
6. Exfoliation tape and exfoliation approach of one to term 5 publication that content of processing is back grinding or dicing process of semi-conductor wafer.
7. Tape for exfoliation which consists of porosity material of permeability.

[0009]

[Embodiment of the Invention] The work article in this invention is for example, a semi-conductor wafer, and processings are back grinding of for example, a semi-conductor wafer, and dicing. In such processing, semiconductor devices, such as CPU, memory or diode, and a transistor, are exfoliated from the time of exfoliating a back-grinding tape after back-grinding termination of a semi-conductor wafer especially, or an after [dicing] dicing tape. An above-mentioned back-grinding tape and an above-mentioned dicing tape are a tape for immobilization at the time of processing.

[0010] A semi-conductor wafer is stuck and processed into the tape for immobilization in back grinding and the dicing of a semi-conductor wafer. And from the tape for immobilization, after processing termination exfoliates an article and the following process is presented with it. When [this] exfoliating, in this invention, an article is made to adhere to the tape for exfoliation, and it is a thing. It can be dealt with without this giving a damage to the component formed a semi-conductor wafer and on it.

[0011] In order to make an article adhere to the tape for exfoliation, it is desirable whether the field of making the tape for exfoliation into porosity material, and making an article adhere and objection is contacted in a reduced pressure ambient atmosphere and that it draws in.

[0012] Reduced pressure or attraction can be performed here using various vacuum pumps, such as a liquid piston pump, a Roots vacuum pump, or an oil sealed rotary pump.

[0013] (What with what kind of attraction jig etc. do we do, and a jig does it specifically have?) Since an installation side will be decompressed or attracted by homogeneity if porosity material is made to intervene between a vacuum line and a semi-conductor wafer, since the base in which the semi-conductor wafer cut and divided is installed with reduced pressure with a vacuum pump at this time is fixed, the phenomenon of fracture and a jump of a semi-conductor wafer and a component can be prevented.

[0014] As porosity material, the form of plastics, such as carbon products, such as the porosity material and graphite which consist of inorganic compounds, such as sintering form of a brick, pottery, a zeolite, carbon random, and various metals, and activated carbon, urethane, and polystyrene, sponge and the transparency film, a demarcation membrane, a nonwoven fabric, etc. are mentioned. Moreover, what carried out perforation processing of the nonvesicular material mechanically using the needle etc. may be used.

[0015] Especially as porosity material, the poly membrane manufactured from viewpoints, such as weak adhesiveness, handling nature, and cost, based on synthetic macromolecule is desirable. What

specifically produced polymer powder, such as polytetrafluoroethylene, polyethylene, and polypropylene, by sintering, What produced partial crystallization polymer films, such as polytetrafluoroethylene, polyethylene, and polypropylene, by the cold stretch and heat treatment, What carried out electron beam irradiation of a polycarbonate, the polyester, etc., etched them, and produced the film, cellulose ester, a polyamide, polysulfone, etc. -- phase changeover (micro phase separation) -- what produced the film by law -- The form (foam) of thermosetting polymer, such as thermoplastic polymers, such as polystyrene, polyolefine, and a polyvinyl chloride, and polyurethane, phenol resin, and melamine resin, is raised. Moreover, what carried out perforation processing of the nonvesicular poly membranes, such as polyolefine, and polyester, a polyvinyl chloride, mechanically with the penetration needle as it was in JP,11-105141,A is mentioned.

[0016] Since reinforcement is small, the poly membrane of such porosity needs the base material of the porosity of high intensity to support a semi-conductor wafer and a component by reduced pressure. What carried out perforation processing of the nonvesicular material, such as the above-mentioned porosity material and above-mentioned metal of an inorganic compound, and a ceramic, a rigid plastic, with the needle or the drill as a base material of this porosity is mentioned.

[0017] It is necessary to fix a semi-conductor wafer and a chip not only at the time of exfoliation but at the inside of equipment and the time of conveyance to degree process for this application. However, it is difficult from constraint of cost, a tooth space, etc. to maintain reduced pressure or an attraction condition at a conveyance process. Then, as for an exfoliation tape, it is desirable to have adhesiveness in extent which does not have trouble in the pickup of a chip because of the gap prevention in the time of conveyance of the semi-conductor wafer carried even if it makes it ordinary pressure, and a chip.

[0018] Adhesiveness can be performed by applying a binder to the front face of an exfoliation tape.

[0019] Although that for which the dicing tape is used as a binder is mentioned, it is not limited to this. Specifically, an acrylic pressure-sensitive adhesion type binder, the binder used by the rubber system binder or UV type are desirable. As for the adhesion, it is desirable to adjust the silicon chip of 10mm angle so that the 20 or less gves of the 50 or less gves of the maximum exfoliation force when exfoliating in a part for 200mm/perpendicularly may be preferably set to 10 or less gves still more preferably. If 50gf(s) are exceeded, a big distortion will occur for a semi-conductor wafer or a component at the time of pickup, and it will become easy to generate a crack and a chip.

[0020] The coating method with which the coating of the above-mentioned binder applies a binder at homogeneity at the whole surface where it is usually used, such as knife coater, a comma roll coater, a reverse roll coater, kiss coater, calender coater, a gravure roll coater, and rod coater, is held. Furthermore, approaches, such as letterpress, lithography, gravure, the method and spray like screen-stencil, and a dipping, may be used.

[0021] Moreover, although it does not become a problem when opening a hole after binder coating, it is desirable to make it a hole not closed, even if it permeates or it does not make a binder solution infiltrate into a hole by adjustment of a coating method, viscosity, wettability, concentration, etc. so that a hole may not be closed in case it applies to the porosity material which already has a hole. Moreover, the approach of removing the said binder solution is also employable as a hole by the after [coating] compressed air etc.

[0022]

[Example] Hereafter, this invention is not limited although the content of invention is further explained to a detail using an example.

[0023] example 1 TOREFAN B02575 (micrometers [25], the Toray Industries, Inc. make, and a drawing polypropylene film --) A glass transition point minus 35 degree C acrylic binder (63 % of the weight of butyl acrylate) Carry out the polymerization of 18 % of the weight of ethyl acrylate, 15 % of the weight of acrylonitrile, 2 % of the weight of 2-hydroxyethyl acrylate, and the 2 % of the weight of the methacrylic acids, and it is obtained. weight average molecular weight consists of about 800,000 polymer, after carrying out coating of the binder which consists of the polyfunctional poly isocyanate (coronate L made from Japanese Polyurethane) 2 weight section to the 100 weight sections so that it may be set to 0.1g/m2 by solid content Perforation processing was carried out with the heated needle,

and macromolecule porous membrane was produced so that it might become 2mm spacing and about 200 micrometers of apertures.

[0024] The semi-conductor wafer (component) with a thickness of 50 micrometers which installed the above-mentioned macromolecule porous membrane for the glass filter whose aperture is 160-250 micrometers as a porosity base material further at a it top on the stage of the dicing equipment which possesses a semi-conductor wafer for the business shown in a conceptual diagram below, and possesses vacuum devices on a ***** stage, and dicing ended was laid with the dicing tape. Subsequently, vacuum devices were operated, it decompressed until the vacuum system was set to 70torr(s), and it fixed, the dicing tape was exfoliated, the component was imprinted on the tape for exfoliation, and the component was taken up in the condition of having returned to ordinary pressure. The test result was summarized in the table.

[0025] Macromolecule porous membrane was similarly produced like the example 1 except using it without carrying out perforation processing of the NITTO DENKO CORP. SUNMAP (100 micrometers) as a base material sheet of the macromolecule porous membrane of example 2 example 1. Next, it took up like the example 1 at intervals of 1.5mm on the plate made from SUS as a porosity base material except k which used the porosity base material which opened the hole whose path is 200 micrometers.

[0026] as the base material sheet of the giant-molecule porous membrane of example 3 example 2 -- the Bridgestone make -- it took up similarly except having used what compressed urethane foam ever RAITO Scott HR-50 (10mm in thickness) into 1mm in thickness.

[0027] as the film for example of comparison 1 dicing -- the Hitachi Chemical Co., Ltd. make -- HAE-1503 were used and the usual dicing and pickup were performed.

[0028] The LINTEC Corp. make D-675 was used as a film for example of comparison 2 dicing, and it took up by usual carrying out after [dicing] UV irradiation.

[0029]

[A table 1]

表1 試験結果					
	実施例1	実施例2	実施例3	比較例1	比較例2
転写時の素子の割れ欠け	無し	無し	無し	有り(60%)	無し
ピックアップ時の素子の割れ欠け	無し	無し	無し	有り(100%)	有り(80%)
剥離力	減圧時	400g	550g	800g	-
	常圧時	10g	6g	5g	50g
					180g

[0030]

[Effect of the Invention] Breakage of an article can be prevented in case the article is exfoliated from the fixed tape for fixing an article at the time of processing according to the approach of this invention.

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TECHNICAL FIELD

[Field of the Invention] From the tape for immobilization for fixing the article which should be processed at the time of processing, especially, this invention relates to the approach of exfoliating the article after processing which demonstrates effectiveness, when work articles are the approach of exfoliating the article after processing, and the thing which is easy to damage thinly.

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PRIOR ART

[Description of the Prior Art] Since it is equivalent to the thin product in an IC card etc. or it multilayers and carries out densification of the semiconductor device by making it thin, while the semi-conductor wafer has diameter[of macrostomia]-ized the wafer itself with enlargement of a component, the application which makes thickness of a wafer thin is increasing in recent years. The reinforcement of the wafer in which the semiconductor device was formed is reduced, in the production process, it is easy to generate troubles, such as a crack and a chip, they have become, and this cure is important for this diameter[of macrostomia]-izing and thinning.

[0003] Back grinding and a dicing process are mentioned as a process which such a trouble tends to generate.

[0004] At a back grinding process, a back-grinding tape is stuck for the purpose of contamination, breakage prevention, etc. of a field in which the semiconductor device was formed, at the process which grinds the semi-conductor wafer in which the semiconductor device was formed, to predetermined thickness. However, in case it exfoliates from the back-grinding tape which has high adhesion after processing termination, a big distortion occurs to a wafer and it is easy to generate a crack and a chip.

[0005] On the other hand, a dicing process is a process cut and divided from a semi-conductor wafer after a back grinding process at each semiconductor device. At this process, a semi-conductor wafer is fixed on the dicing tape on which the binder was applied to base tapes, such as a vinyl chloride and polyester, it is taken up by the attraction fixture called a collet and each component after cutting is conveyed to degree process. While sufficient adhesion in which each component does not disperse is required for this dicing tape at the revolution by the dicing saw at the time of cutting, it needs to be satisfied with each component of the conflicting requirement that it is adhesion with low extent which does not require a load, at the time of pickup.

[0006] Therefore, although the dicing tape which is called UV type recently, irradiates ultraviolet rays (UV) before being high adhesion and taking up at the time of cutting, and responds adhesion to several [1/] to 1/10 or less at a lowering conflicting requirement is adopted widely Even if it fell, in order that variation was in the adhesion lowering by UV irradiation, or several g adhesion might remain, at the time of pickup, it needed to thrust up by the pin from the bottom, therefore also conventionally thrust up, and there was not no damage of the component by the pin. Furthermore enlargement of a component and thin shape-ization progress, the damage by the pressure-from-below pin becomes remarkable, and the cure is becoming important.

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EFFECT OF THE INVENTION

[Effect of the Invention] Breakage of an article can be prevented in case the article is exfoliated from the fixed tape for fixing an article at the time of processing according to the approach of this invention.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] This invention was made in view of the above-mentioned problem, and the object is in offering the exfoliation approach which can prevent breakage of the article generated in case the article is exfoliated from the fixed tape for fixing an article at the time of processing like the back grinding process of a semi-conductor wafer, or a dicing process.

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MEANS

[Means for Solving the Problem] This invention relates to the following.

1. Exfoliation approach characterized by facing article processed from tape for immobilization at time of processing exfoliating, and making work article adhere to tape for exfoliation.
2. Exfoliation approach of term 1 publication which tape for exfoliation is porosity material, faces making work article adhere, and attracts from other fields of tape for exfoliation (reduced pressure).
3. Exfoliation approach of term 2 publication characterized by porosity material consisting of porous poly membrane.
4. Term 2 characterized by making porous base material intervene between equipment for drawing in (reduced pressure) or fixture, and porosity material, or exfoliation approach given in three.
5. Exfoliation approach given in either of terms 2-4 which are what has adhesiveness in extent which can prevent omission and gap of processing product which adhered when front face of porosity material returned to ordinary pressure.
6. Exfoliation tape and exfoliation approach of one to term 5 publication that content of processing is back grinding or dicing process of semi-conductor wafer.
7. Tape for exfoliation which consists of porosity material of permeability.

[0009]

[Embodiment of the Invention] The work article in this invention is for example, a semi-conductor wafer, and processings are back grinding of for example, a semi-conductor wafer, and dicing. In such processing, semiconductor devices, such as CPU, memory or diode, and a transistor, are exfoliated from the time of exfoliating a back-grinding tape after back-grinding termination of a semi-conductor wafer especially, or an after [dicing] dicing tape. An above-mentioned back-grinding tape and an above-mentioned dicing tape are a tape for immobilization at the time of processing.

[0010] A semi-conductor wafer is stuck and processed into the tape for immobilization in back grinding and the dicing of a semi-conductor wafer. And from the tape for immobilization, after processing termination exfoliates an article and the following process is presented with it. When [this] exfoliating, in this invention, an article is made to adhere to the tape for exfoliation, and it is a thing. It can be dealt with without this giving a damage to the component formed a semi-conductor wafer and on it.

[0011] In order to make an article adhere to the tape for exfoliation, it is desirable whether the field of making the tape for exfoliation into porosity material, and making an article adhere and objection is contacted in a reduced pressure ambient atmosphere and that it draws in.

[0012] Reduced pressure or attraction can be performed here using various vacuum pumps, such as a liquid piston pump, a Roots vacuum pump, or an oil sealed rotary pump.

[0013] (What with what kind of attraction jig etc. do we do, and a jig does it specifically have?) Since an installation side will be decompressed or attracted by homogeneity if porosity material is made to intervene between a vacuum line and a semi-conductor wafer, since the base in which the semi-conductor wafer cut and divided is installed with reduced pressure with a vacuum pump at this time is fixed, the phenomenon of fracture and a jump of a semi-conductor wafer and a component can be prevented.

[0014] As porosity material, the form of plastics, such as carbon products, such as the porosity material and graphite which consist of inorganic compounds, such as sintering form of a brick, pottery, a zeolite, carbon random, and various metals, and activated carbon, urethane, and polystyrene, sponge and the transparency film, a demarcation membrane, a nonwoven fabric, etc. are mentioned. Moreover, what carried out perforation processing of the nonvesicular material mechanically using the needle etc. may be used.

[0015] Especially as porosity material, the poly membrane manufactured from viewpoints, such as weak adhesiveness, handling nature, and cost, based on synthetic macromolecule is desirable. What specifically produced polymer powder, such as polytetrafluoroethylene, polyethylene, and polypropylene, by sintering, What produced partial crystallization polymer films, such as polytetrafluoroethylene, polyethylene, and polypropylene, by the cold stretch and heat treatment, What carried out electron beam irradiation of a polycarbonate, the polyester, etc., etched them, and produced the film, cellulose ester, a polyamide, polysulfone, etc. -- phase changeover (micro phase separation) -- what produced the film by law -- The form (foam) of thermosetting polymer, such as thermoplastic polymers, such as polystyrene, polyolefine, and a polyvinyl chloride, and polyurethane, phenol resin, and melamine resin, is raised. Moreover, what carried out perforation processing of the nonvesicular poly membranes, such as polyolefine, and polyester, a polyvinyl chloride, mechanically with the penetration needle as it was in JP,11-105141,A is mentioned.

[0016] Since reinforcement is small, the poly membrane of such porosity needs the base material of the porosity of high intensity to support a semi-conductor wafer and a component by reduced pressure. What carried out perforation processing of the nonvesicular material, such as the above-mentioned porosity material and above-mentioned metal of an inorganic compound, and a ceramic, a rigid plastic, with the needle or the drill as a base material of this porosity is mentioned.

[0017] It is necessary to fix a semi-conductor wafer and a chip not only at the time of exfoliation but at the inside of equipment and the time of conveyance to degree process for this application. However, it is difficult from constraint of cost, a tooth space, etc. to maintain reduced pressure or an attraction condition at a conveyance process. Then, as for an exfoliation tape, it is desirable to have adhesiveness in extent which does not have trouble in the pickup of a chip because of the gap prevention in the time of conveyance of the semi-conductor wafer carried even if it makes it ordinary pressure, and a chip.

[0018] Adhesiveness can be performed by applying a binder to the front face of an exfoliation tape.

[0019] Although that for which the dicing tape is used as a binder is mentioned, it is not limited to this. Specifically, an acrylic pressure-sensitive adhesion type binder, the binder used by the rubber system binder or UV type are desirable. As for the adhesion, it is desirable to adjust the silicon chip of 10mm angle so that the 20 or less gves of the 50 or less gves of the maximum exfoliation force when exfoliating in a part for 200mm/perpendicularly may be preferably set to 10 or less gves still more preferably. If 50gf(s) are exceeded, a big distortion will occur for a semi-conductor wafer or a component at the time of pickup, and it will become easy to generate a crack and a chip.

[0020] The coating method with which the coating of the above-mentioned binder applies a binder at homogeneity at the whole surface where it is usually used, such as knife coater, a comma roll coater, a reverse roll coater, kiss coater, calender coater, a gravure roll coater, and rod coater, is held. Furthermore, approaches, such as letterpress, lithography, gravure, the method and spray like screen-stencil, and a dipping, may be used.

[0021] Moreover, although it does not become a problem when opening a hole after binder coating, it is desirable to make it a hole not closed, even if it permeates or it does not make a binder solution infiltrate into a hole by adjustment of a coating method, viscosity, wettability, concentration, etc. so that a hole may not be closed in case it applies to the porosity material which already has a hole. Moreover, the approach of removing the said binder solution is also employable as a hole by the after [coating] compressed air etc.

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EXAMPLE

[Example] Hereafter, this invention is not limited although the content of invention is further explained to a detail using an example.

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[0024] The semi-conductor wafer (component) with a thickness of 50 micrometers which installed the above-mentioned macromolecule porous membrane for the glass filter whose aperture is 160-250 micrometers as a porosity base material further at a it top on the stage of the dicing equipment which possesses a semi-conductor wafer for the business shown in a conceptual diagram below, and possesses vacuum devices on a ***** stage, and dicing ended was laid with the dicing tape. Subsequently, vacuum devices were operated, it decompressed until the vacuum system was set to 70torr(s), and it fixed, the dicing tape was exfoliated, the component was imprinted on the tape for exfoliation, and the component was taken up in the condition of having returned to ordinary pressure. The test result was summarized in the table.

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[0026] as the base material sheet of the giant-molecule porous membrane of example 3 example 2 -- the Bridgestone make -- it took up similarly except having used what compressed urethane foam ever RAITO Scott HR-50 (10mm in thickness) into 1mm in thickness.

[0027] as the film for example of comparison 1 dicing -- the Hitachi Chemical Co., Ltd. make -- HAE-1503 were used and the usual dicing and pickup were performed.

[0028] The LINTEC Corp. make D-675 was used as a film for example of comparison 2 dicing, and it took up by usual carrying out after [dicing] UV irradiation.

[0029]

[A table 1]

表1 試験結果

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ピックアップ時の素子の割れ欠け		無し	無し	無し	有り(100%)	有り(80%)
剥離力	減圧時	400g	550g	800g	-	-
	常圧時	10g	5g	5g	50g	180g

[Translation done.]

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開2001-291760

(P2001-291760A)

(43) 公開日 平成13年10月19日 (2001. 10. 19)

(51) Int.Cl. ⁷	識別記号	F I	ターミナル* (参考)
H 0 1 L 21/68		H 0 1 L 21/68	E 3 F 1 0 8
B 6 5 H 41/00		B 6 5 H 41/00	Z 5 F 0 3 1
H 0 1 L 21/304	6 3 1	H 0 1 L 21/304	6 3 1
21/301		21/78	P

審査請求 未請求 請求項の数 7 O L (全 4 頁)

(21) 出願番号 特願2000-343905 (P2000-343905)

(22) 出願日 平成12年11月10日 (2000. 11. 10)

(31) 優先権主張番号 特願2000-27347 (P2000-27347)

(32) 優先日 平成12年1月31日 (2000. 1. 31)

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F ターミナル (参考) 3F108 JA07

5F031 CA02 CA13 MA34 MA38

(54) 【発明の名称】 剥離方法及び剥離用テープ

(57) 【要約】

【課題】 本発明目的は半導体ウエハのバックグラインド工程やダイシング工程のような加工時に物品を固定するための固定テープからその物品を剥離する際発生する物品の破損を防ぐことができる剥離方法を提供することにある。

【解決手段】 加工時固定用テープから加工された物品を剥離するに際し、加工物品を剥離用テープに付着させ、特に好ましくは、剥離用テープとして多孔質材を使用し、加工物品を付着させるに際し、剥離用テープの他の面から吸引（減圧）することを特徴とする剥離方法。

【特許請求の範囲】

【請求項1】 加工時固定用テープから加工された物品を剥離するに際し、加工物品を剥離用テープに付着させることを特徴とする剥離方法。

【請求項2】 剥離用テープが多孔質材であり、加工物品を付着させるに際し、剥離用テープの他の面から吸引（減圧）する請求項1記載の剥離方法。

【請求項3】 多孔質材が多孔質の高分子膜からなることを特徴とする請求項2記載の剥離方法。

【請求項4】 吸引（減圧）するための装置又は治具と多孔質材の間に多孔質の支持体を介在させることを特徴とする請求項2又は3記載の剥離方法。

【請求項5】 多孔質材の表面が常圧に戻した際付着した加工製品の脱落やずれを防止することができる程度に、粘着性を有するものである請求項2～4のいずれかに記載の剥離方法。

【請求項6】 加工の内容が半導体ウエハのバックグラインドもしくはダイシング工程である請求項1から5記載の剥離テープおよび剥離方法。

【請求項7】 通気性の多孔質材からなる剥離用テープ。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、加工すべき物品を加工時固定するための固定用テープから、加工後の物品を剥離する方法、特に、加工物品が薄く破損しやすいものであるときに効果を発揮する加工後の物品を剥離する方法に関する。

【0002】

【従来の技術】近年半導体ウエハは素子の大型化に伴いウエハ自体も大口径化している一方、半導体素子を薄くすることで多層化し高密度化するあるいはICカード等での薄い製品に対応するためウエハの肉厚を薄くする用途が増大しつつある。この大口径化や薄肉化は半導体素子を形成したウエハの強度を低下させ、製造工程のなかで割れや欠けといったトラブルが発生し易くなっておりこの対策が重要である。

【0003】このようなトラブルが発生し易い工程としてバックグラインドおよびダイシング工程が挙げられる。

【0004】バックグラインド工程では、半導体素子を形成した半導体ウエハを所定の厚みまで研磨する工程で、半導体素子を形成した面の汚染や破損防止等を目的にバックグラインドテープを貼付ける。しかし加工終了後高い粘着力をもつバックグラインドテープから剥離する際ウエハに大きな歪みが発生し割れや欠けが発生し易い。

【0005】一方ダイシング工程はバックグラインド工程の後に半導体ウエハから個々の半導体素子に切断・分割する工程である。この工程では塩化ビニルやポリエ

テル等のベーステープに粘着剤が塗布されたダイシングテープ上に半導体ウエハを固定し、切断後各素子をコレットと呼ばれる吸引治具によりピックアップされ次工程へ搬送する。このダイシングテープは切断時にはダイシングソウによる回転で各素子が飛散しない十分な粘着力が必要である一方、ピックアップ時には各素子に負荷がかからない程度の低い粘着力であるといった相反する要求を満足する必要がある。

【0006】そのため、最近ではUVタイプと呼ばれ、切断時には高粘着力で、ピックアップする前に紫外線（UV）を照射し粘着力を数分の一から十分の一以下に下げ相反する要求に応えるダイシングテープが広く採用されているが、UV照射による粘着力低下にバラツキがある、あるいは低下しても数gの粘着力は残るため、ピックアップ時には下からピンで突上げる必要があり、そのため従来でも突上げピンによる素子のダメージは皆無ではなかった。さらに素子の大型化、薄型化が進み突上げピンによるダメージが顕著になり、その対策が重要になってきた。

【0007】

【発明が解決しようとする課題】本発明は前述の問題を鑑みなされたもので、その目的は半導体ウエハのバックグラインド工程やダイシング工程のような加工時に物品を固定するための固定テープからその物品を剥離する際発生する物品の破損を防ぐことができる剥離方法を提供することにある。

【0008】

【課題を解決するための手段】本発明は、次のものに関する。

1. 加工時固定用テープから加工された物品を剥離するに際し、加工物品を剥離用テープに付着させることを特徴とする剥離方法。

2. 剥離用テープが多孔質材であり、加工物品を付着させるに際し、剥離用テープの他の面から吸引（減圧）する項1記載の剥離方法。

3. 多孔質材が多孔質の高分子膜からなることを特徴とする項2記載の剥離方法。

4. 吸引（減圧）するための装置又は治具と多孔質材の間に多孔質の支持体を介在させることを特徴とする項2又は3記載の剥離方法。

5. 多孔質材の表面が常圧に戻した際付着した加工製品の脱落やずれを防止することができる程度に、粘着性を有するものである項2～4のいずれかに記載の剥離方法。

6. 加工の内容が半導体ウエハのバックグラインドもしくはダイシング工程である項1～5記載の剥離テープおよび剥離方法。

7. 通気性の多孔質材からなる剥離用テープ。

【0009】

【発明の実施の形態】本発明における加工物品とは例え

ば、半導体ウエハであり、加工とは、例えば、半導体ウエハのバックグランドやダイシングのことである。このような加工において、特に、半導体ウエハのバックグランド終了後にバックグランドテープを剥離する際やダイシング後ダイシングテープからCPUやメモリあるいはダイオードやトランジスタなどの半導体素子を剥離する。上記のバックグランドテープやダイシングテープが、加工時固定用テープである。

【0010】半導体ウエハのバックグランドやダイシングにおいては、半導体ウエハは、固定用テープに貼着して加工される。そして、加工終了後は、固定用テープから、物品を剥離し、次の工程に供される。この剥離するときに、本発明では、物品を剥離用テープに付着させるものである。これにより、半導体ウエハやその上に形成された素子にダメージを与えることなく取り扱うことができる。

【0011】物品を剥離用テープに付着させるためには、剥離用テープを多孔質材とし、物品を付着させるのと反対の面を減圧雰囲気と接触させるか吸引することが好ましい。

【0012】ここで減圧又は吸引は、水封ポンプやルーツポンプあるいは油回転ポンプといった各種真空ポンプを用いて行うことができる。

【0013】(具体的には、どのような吸引治具等をどのようにしようするか)この時真空ポンプでの減圧により、切断・分割する半導体ウエハを設置する台を固定するために真空ラインと半導体ウエハの間に多孔質材を介在させると設置面が均一に減圧若しくは吸引されるため、半導体ウエハや素子の破断や飛びといった現象が防げる。

【0014】多孔質材としては、れんが、陶磁器、ゼオライト、カーボンランダム、各種金属の焼結フォーム等の無機化合物からなる多孔質材、黒鉛、活性炭等の炭素製品、ウレタン、ポリスチレン等のプラスチックのフォームやスポンジ、透過膜や分離膜、不織布等が挙げられる。また、非多孔質材を針等を用いて機械的に孔あけ加工したものを使用してもよい。

【0015】多孔質材としては、特に、弱粘着性、ハンドリング性、コスト等の観点から合成高分子をベースに製造された高分子膜が好ましい。具体的には、ポリ四フッ化エチレン、ポリエチレン、ポリプロピレン等のポリマパウダーを焼結により製膜したもの、ポリ四フッ化エチレン、ポリエチレン、ポリプロピレン等の部分結晶化ポリマフィルムを冷延伸・熱処理により製膜したもの、ポリカーボネート、ポリエステル等を電子線照射しエッチングし製膜したもの、セルロースエステル、ポリアミド、ポリスルホン等を相転換(ミクロ相分離)法で製膜したもの、ポリスチレン、ポリオレフィン、ポリ塩化ビニル等の熱可塑性ポリマ及びポリウレタン、フェノール樹脂、メラミン樹脂等の熱硬化性ポリマのフォーム(発

泡体)があげられる。また特開平11-105141号公報にあるようにポリオレフィンやポリエステル、ポリ塩化ビニル等の非多孔質の高分子膜を貫通針で機械的に孔あけ加工したものも挙げられる。

【0016】これらの多孔質の高分子膜は半導体ウエハや素子を減圧で支えるには強度が小さいため、高強度の多孔質の支持体が必要である。この多孔質の支持体としては前述の無機化合物の多孔質材および金属やセラミックおよび硬質プラスチック等の非多孔質材を針やドリルで孔あけ加工したものが挙げられる。

【0017】本用途では剥離時だけでなく装置内および次工程への搬送時も半導体ウエハやチップを固定する必要がある。しかし、搬送工程では減圧若しくは吸引状態を維持することがコストおよびスペース等の制約から難しい。そこで常圧にしても搭載している半導体ウエハやチップの搬送時でのずれ防止のため、剥離テープはチップのピックアップに支障のない程度に粘着性を有していることが望ましい。

【0018】粘着性を剥離テープの表面に粘着剤を塗布することにより行うことができる。

【0019】粘着剤としてはダイシングテープの使用されているものが挙げられるがこれに限定されるものではない。具体的には感圧接着タイプのアクリル系粘着剤やゴム系粘着剤あるいはUVタイプで使用される粘着剤等が好ましい。その粘着力は、10mm角のシリコンチップを垂直方向に200mm/分で剥離した時の最大剥離力が50gf以下、好ましくは20gf以下さらに好ましくは10gf以下になるよう調整することが好ましい。50gfを越えるとピックアップ時に半導体ウエハや素子に大きな歪みが発生し割れや欠けが発生し易くなる。

【0020】上記の粘着剤の塗工はナイフコート、コンマロールコート、リバースロールコート、キスコート、カレンダーコート、グラビアロールコート、ロッドコート等の通常使用される全面に均一に粘着剤を塗布する塗工方式が挙げられる。さらに、凸版、平版、グラビア、スクリーン印刷のような方式やスプレー、浸せきといった方法でもかまわない。

【0021】また、粘着剤塗工後に孔をあける場合は問題とならないが、既に孔のある多孔質材に塗布する際は孔がふさがらないように、塗工方式、粘度、濡れ性、濃度等の調整で粘着剤溶液を孔へ浸入をさせないもしくは浸入しても孔がふさがらないようにすることが好ましい。また、塗工後圧縮空気等で孔にはいった粘着剤溶液を除去するといった方法も採用できる。

【0022】

【実施例】以下、実施例を用い発明の内容をさらに詳細に説明するが本発明を限定するものではない。

【0023】実施例1

トレファンB02575(25μm、東レ(株)製、延

伸ポリプロピレンフィルム、)にガラス転移点マイナス35℃のアクリル系粘着剤(ブチルアクリレート63重量%、エチルアクリレート18重量%、アクリロニトリル15重量%、2-ヒドロキシエチルアクリレート2重量%及びメタクリル酸2重量%を重合させて得られ、重量平均分子量が約80万の重合体からなる)100重量部に対し多官能ポリイソシアネート(日本ポリウレタン(株)製コロネートL)2重量部からなる粘着剤を固形分で0.1g/m²になるように塗工した後、2mm間隔、孔径約200μmになるように、加熱した針で孔あけ加工し、高分子多孔質膜を作製した。

【0024】つぎに概念図に示す用に、半導体ウエハを載置くステージに真空装置を具備するダイシング装置のステージ上に多孔質支持体として孔径が160~250μmのガラスフィルターを、さらにその上に前述の高分子多孔質膜を設置し、ダイシングの終了した厚さ50μmの半導体ウエハ(素子)をダイシングテープとともに載置した。ついで、真空装置を作動させ、真空系が70torrになるまで減圧し、固定して、ダイシングテープを剥離し、剥離用テープに素子を転写し、常圧に戻した状態で素子のピックアップを行った。試験結果を表にまとめた。

【0025】実施例2

* 実施例1の高分子多孔質膜の基材シートとして日東電工(株)SUNMAP(100μm)を孔あけ加工しないで使用すること以外は、実施例1と同様にして同様に高分子多孔質膜を作製した。つぎに、多孔質支持体としてSUS製プレートに1.5mm間隔で、径が200μmの孔をあけた多孔質支持体を使用したkと以外は実施例1と同様にしてピックアップした。

【0026】実施例3

実施例2の高分子多孔質膜の基材シートとしてプリジストン製ウレタンフォームエバーライトスコットHR-50(厚さ10mm)を厚さ1mmに圧縮したものを使用したこと以外は同様にしてピックアップした。

【0027】比較例1

ダイシング用のフィルムとして日立化成工業(株)製HAE-1503を使用し、通常のダイシングおよびピックアップを行った。

【0028】比較例2

ダイシング用のフィルムとしてリンテック(株)製D-675を使用し、通常のダイシング後UV照射し、ピックアップを行った。

【0029】

【表1】

*

表1 試験結果

	実施例1	実施例2	実施例3	比較例1	比較例2
転写時の素子の割れ欠け	無し	無し	無し	有り(60%)	無し
ピックアップ時の素子の割れ欠け	無し	無し	無し	有り(100%)	有り(80%)
剥離力	減圧時	400g	550g	800g	-
	常圧時	10g	5g	5g	50g

【0030】

30※固定するための固定テープからその物品を剥離する際

【発明の効果】本発明の方法によれば、加工時に物品を※に、物品の破損を防ぐことができる。